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## Teratological Notes.

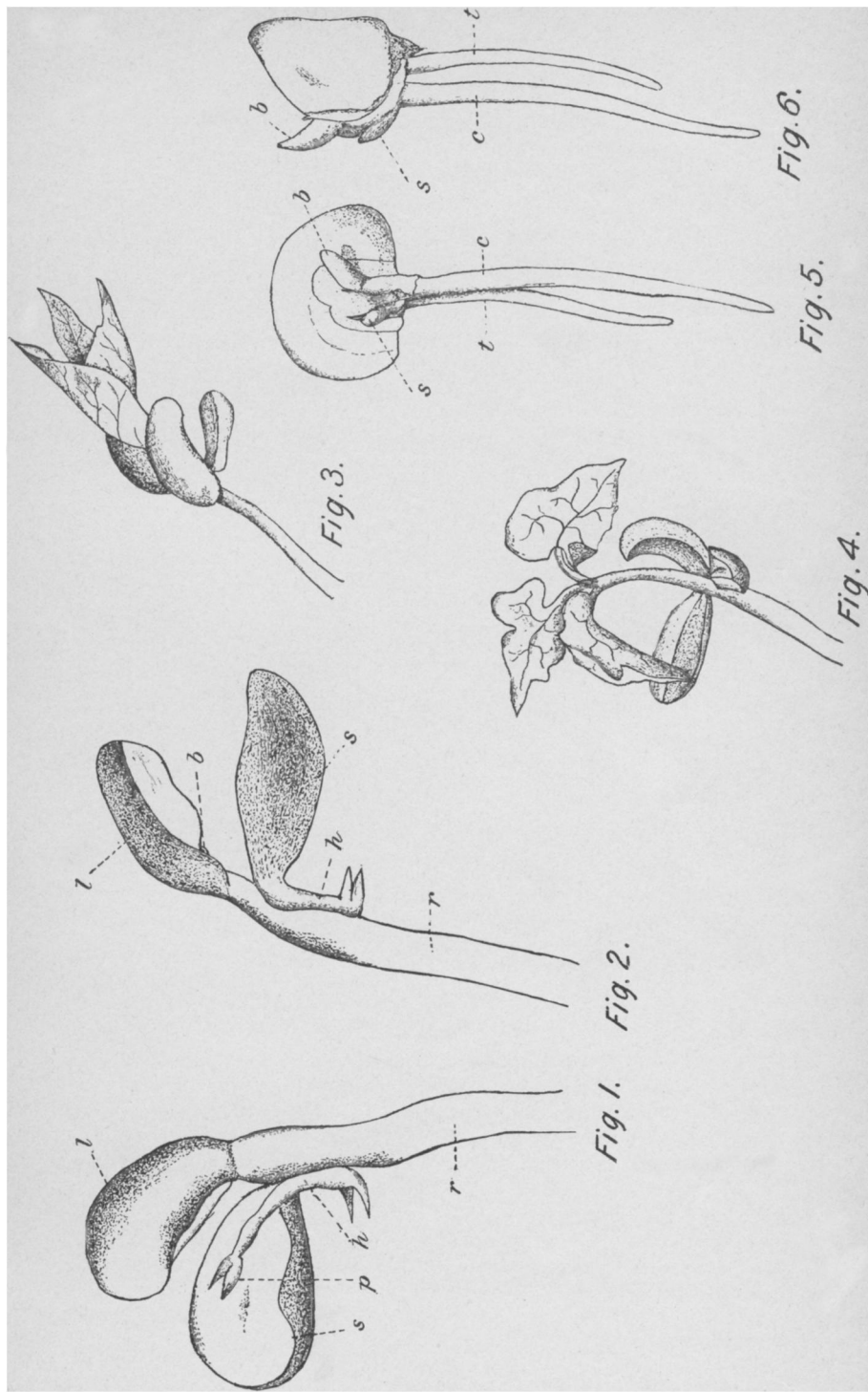
BY HERMANN SCHRENK.

(PLATE 204.)

In growing a number of seedlings for physiological experiments, some curious forms of the common bean (*Phaseolus vulgaris*) were found.

The first was a case of division of the embryo into two unequal halves, which, although they were united, seemed to grow independently. The hypocotyle had been divided, and to each half one cotyledon was attached, while the plumule remained entire and was joined to one-half of the hypocotyle (Figs. 1 and 2). In germinating both halves of the hypocotyle broke through the seed-coats, but one of them (*r*), grew very much faster than the other. The result was that the smaller half with its cotyledon and the plumule was pushed above the soil (*s. p. h.*). When the plant was about one inch in height, the smaller hypocotyle produced two thick prong-like roots, but several days passed and still the plumule showed no signs of activity. The other half meanwhile was growing vigorously, the cotyledon markedly diminished in size, and a bud appeared at the union of the hypocotyle with the cotyledon (*b. Fig. 2*). This increased in size and began to unfold; a small leaf appeared similar in shape to the primordial leaves. Another bud was formed, but it was weak and never developed.

The smaller half had grown very little, the hypocotyle thickened somewhat, but otherwise no change took place. From this it would seem that there had been no passage of nutritive material or water from the part of the plant connected with the soil to the other half, in other words, the two parts appeared like separate individuals. After eight days the smaller half showed signs of wilting. With a sharp razor the cotyledon (*s*), the plumule (*p*) and hypocotyle (*h*) were cut from the other half of the hypocotyle (*r*) and were planted in rich soil. The next day the plumule began to unfold, the two primordial leaves spread out, but they remained small and developed no further. The whole died shortly after. The roots produced by the hypocotyle had no doubt been weak-



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ened by the week's exposure to the air (although kept in a very moist atmosphere), and were no longer capable of absorbing.

Some twenty or thirty seeds were found that had three cotyledons. The majority of these developed three primordial leaves instead of two (Figs. 3 and 4). Two of the three cotyledons were of approximately the same size, and were situated on the first node, about sixty degrees apart. The third cotyledon was somewhat smaller than the other two and was placed a little above the node, midway between the others. The plumule had the three primordial leaves fully formed in each case examined; they were in a whorl and alternated with the cotyledons. The bud situated between them elongated, but, instead of a single three-parted leaf being formed at the third node, two opposite leaves appeared. In some of the seedlings two buds were situated between the whorl at the second node, each of which formed an internode, at the end of which was a three-parted leaf. From this point each stem grew regularly, giving rise to a twining stem bearing alternate leaves. Six of the plants were allowed to flower and ripen their seed; the latter were planted, but not one of the forty-four seeds grew into seedlings with more than two cotyledons.

An interesting case of polyembryony was met with in two seeds of the Indian corn (*Zea Mays*) (Figs. 5 and 6). Two hypocotyles ruptured the seed coats about the same time, and the following day two plumules made their appearance. One of the seeds was allowed to grow. Both plumules formed healthy leaves, the hypocotyles developed strong roots, and to all appearances both plants were as vigorous as if they had been grown from separate seeds.

#### **Description of Plate 204.**

FIGS. 1 and 2.—“s,” cotyledon of smaller half; “l” cotyledon of larger half; “p,” plumule; “h,” smaller hypocotyle; “r,” larger hypocotyle; “b,” bud (×2).

FIG. 3.—Bean with three cotyledons; seven days old.

FIG. 4.—Bean with three cotyledons; two days older.

FIG. 5.—Front view of corn. “b,” larger plumule; “s,” smaller plumule just breaking through the coats. “t,” smaller hypocotyle; “c,” larger hypocotyle.

FIG. 6.—Side view of corn. (Same lettering as Fig. 5.) (×2)

BOTANICAL LABORATORY, Cornell University.